

## POLE ASSEMBLY

### Field of the Invention

This invention relates to a pole assembly for mounting at least one item thereto. Such

- 5 items may include streetlights, signs, traffic signals, pedestrian signals, security cameras, banners and the like.

### Background to the Invention

Poles for the mounting of streetlights, signs, pedestrian signals, traffic signals, security

cameras, banners and the like are well known and generally take the form of structural

- 10 columns with out-reach arms and brackets fitted at various positions to support lights, signs and other ancillary items at desired heights and positions. These poles are generally made from hard wood, reinforced concrete or from tubular galvanised steel or extruded aluminium. Tubular poles have the advantage of the ability to hide switchgear, cables and the like inside the pole.

- 15 Australian Patent No. 741370 applied for by the Council of the City of Sydney and published in year 1998 describes "A Multi-function Pole" comprising a hollow column with one or more internal or recessed tracks to aid the mounting of ancillaries, such as street lights, signs, and the like. The multi-function pole of this disclosure suffers from a number of disadvantages.

- 20 One major disadvantage of internal or recessed tracks is that the geometry of the inside of the pole makes it difficult to simply reinforce the pole because the inside profile of the pole is not round and the tracks take up significant space inside the pole.

Hollow or tubular poles can also suffer from internal corrosion because of moisture ingress.

- 25 Fluted cladding is often fitted to the lower part of street poles to improve appearance, hide access hatches and make it difficult to add unwanted graffiti or bills to the lower part of poles.

Furthermore, such poles are generally installed by one of three methods. The first method is the “direct bury” technique where the base of the pole is buried in a hole in the ground that may or may not be lined with concrete. Earth, rock or concrete is generally compressed into the gap around the base of the pole to firmly hold it in place. The second method utilises a 5 spigot, which is fixed into a concrete block in the ground. The pole fits over the spigot with the lower end of the pole at ground level so that the spigot is hidden from view. In a third method, a rigid base is attached to the bottom of the pole and the base is bolted onto the top of a concrete block that is just above or below ground level.

10 Each of these methods suffers from disadvantages. For example, poles that are direct buried or installed on spigots are difficult to install in a completely vertical position and they are also difficult to replace. Although the use of a pole base overcomes these problems, the base and fixing bolts can trip pedestrians if installed above or at ground level. Alternatively, if the base is installed below ground level, the hidden installation bolts and base can then 15 corrode and fail without warning.

The present invention preferably overcomes or ameliorates one or more of the disadvantages of the prior art.

#### Summary of the Invention

20 In a first aspect the present invention consists in a pole assembly for supporting at least one item, the pole assembly comprising at least one tubular column having at least two longitudinally extending external tracks integrally disposed therein.

Preferably each of said external tracks has an internal groove adjacent thereto.

25 Preferably a reinforcing sleeve is internally fitted along at least a portion of said tubular column.

Preferably a round tubular section telescopically extends from said column.

Preferably said round tubular section has at least one internal track.

Preferably at least one fluted cladding member is secured to said column by at least two circular collars.

Preferably a deformable clamp block is adapted to interconnect said at least one item to said column and said deformable clamp block engages with at least one of said external tracks of said column.

Preferably said at least one item is an arm fixedly engaged with one of said internal

5 grooves to prevent the rotation of said arm relative to said column.

Preferably said deformable clamp block is adapted to be relatively movable with respect to said column to allow an angular adjustment of said at least one item relative to the longitudinal axis of said column.

Preferably said pole assembly further comprises a ventilated pole cap.

10 Preferably in one embodiment said round tubular section projects from the upper end of said column.

Preferably in another embodiment said round tubular section projects from the lower end of said column. Preferably said round tubular section is connected to a base member.

Preferably said base member is fully mounted within a drainage pit.

15 Preferably said pit is covered by a lid and at least two jacking screws are located in said drainage pit for adjustment of the height of said lid relative to surrounding ground level.

Preferably at least one fluted cladding member is secured to said column by at least an upper circular collar and a lower circular collar, and the bottom of said lower circular collar is seated on a ridge disposed on said lid.

20 Preferably at least one item is any one of a streetlight, sign, traffic signal, pedestrian signal, security camera or banner.

#### Brief Description of Drawings

Notwithstanding any other forms that may fall within its scope, some preferred forms of the invention will now be described by way of example only with reference to the

25 accompanying drawings in which:

Figure 1 is an end view of a structural column of a pole assembly according to a first embodiment of the invention.

Figure 2 is an end view of the structural column shown in Figure 1, with internal dividers inserted.

5 Figure 3 is an end view of a structural column of a pole assembly according to a second embodiment of the invention.

Figure 4 is a perspective view showing the attachment of a telescopic pole top with internal tracks for attachment of ancillaries, to the column shown in Figure 1.

10 Figure 5 is a perspective view of a pole assembly in accordance with a third embodiment of the invention.

Figure 6 is a horizontal cross section through VI-VI of Figure 5.

Figure 7 is a vertical cross section through VII-VII of Figure 5.

Figure 8 is an end view of a clamp block in an open position fitted to a column of Figure 1.

15 Figure 9 is an end view of the clamp block of Figure 8 in the closed position holding a street name sign to the column.

Figure 10 is a horizontal cross section through the assembly of an outreach arm fitted to the column by a clamp block of the pole assembly shown in Figure 5.

20 Figure 11 is a horizontal cross section showing engagement of the outreach arm spigot assembly in the internal groove of the column shown in Figure 5.

Figure 12 is a vertical cross section showing assembly of the outreach arm and ventilated cap to the pole assembly shown in Figure 5.

Figure 13 is a section through the centre of a pit, in which the base of a pole assembly of Figure 5 is housed.

Detailed Description of the Preferred Embodiments

A first embodiment of a structural column 1 of a pole assembly in accordance with the present invention is depicted in Figures 1 and 2. The horizontal cross section of structural column 1, with four integral external tracks 2 and four longitudinal internal grooves 3

5 adjacent to the tracks 2, is depicted in Figure 1. The column 1 may preferably be manufactured from extruded aluminium alloy.

Figure 2 shows how the longitudinal internal grooves 3 inside the column 1 aid in the fitting of a plate 4, inside the column 1. Plate 4 may be used to reinforce the pole assembly, and/or divide the interior of the column 1 into two or more sections, or be

10 utilised for the mounting of switchgear or the like.

A second embodiment of a pole assembly in accordance with the present invention is depicted in Figure 3. In this embodiment the pole assembly is a composite pole assembly.

The composite pole assembly comprises a column 1 with external tracks 2, with an internal structural reinforcing sleeve 5 fitted for part or all of its length. The reinforcing

15 sleeve 5 would generally be of a circular cross section. It may be manufactured from a structural grade of extruded aluminium, galvanised steel or other structural material. It may preferably be used to reinforce the lower part of the column 1. The reinforcing sleeve 5 may include internal tracks or grooves 103 to aid in the mounting of ancillary items such as switchgear inside the pole. The sleeve 5 may be fixed inside the pole 1 by adhesive, fasteners, welding or a combination of these.

The attachment of a telescopic pole top 6, with internal tracks 7 for attachment of ancillaries, is shown in Figure 4. The pole top 6 slides inside the column 1 with a typical overlap of say three times the diameter of column 1. It is held in place by adhesive, fasteners such as security screws 108, welding or a combination thereof.

25 Figures 5 and 6 depict a third embodiment of a pole assembly in accordance with the present invention. Like reference numerals are used to denote components common to the first, second and third embodiments. Figure 5 is a perspective view of a pole assembly comprising a column 1 with outreach arm 9, streetlight 10, deformable clamp block 11, street name sign 12, fluted cladding 13, recessed circular collars 14, base plate 30 15 and ventilated cap 16 shown.

Figure 6 depicts a horizontal cross section of the lower portion of the pole assembly showing the fluted cladding 13 fitted around the column 1 and held in place by the recessed circular collar 14. The cladding 13 is shown fitted in four sections but it could be in any number of sections. The cladding 13 is preferably manufactured from extruded 5 aluminium alloy, sheet metal, extruded plastic, plastic mouldings or other appropriate material. The collars 14 could be made from cast, moulded, spun or machined metal or plastic.

Figure 7 is a vertical cross section of the lower portion of the pole assembly depicting the fluted cladding 13, recessed circular collars 14 and fasteners 17 that hold the collars 14 in 10 place. Only a single fastener 17, such as a grub screw or security screw is required to lock each collar 14 in place and the cladding 13 is captured between the two collars without the need for any fixing holes in the cladding 13 itself. This is a low cost method of attaching cladding with the further advantage that the height of the cladding assembly above the ground level is readily adjusted on site following pole erection.

15 A deformable clamp block 11 in the open or pre-deformed state is shown in Figure 8. The fasteners 18 shown in Figure 9 are used to deform or bend the block 11 until it locks onto the external track 2 of the pole 1. The clamp block 11 shown in Figure 9 is used to attach a street name sign to pole 1 via fasteners 19. Various forms of clamp block 11 can be used to fit traffic light brackets, pedestrian signals, security cameras, banner arms, 20 cable exits and the like to the external tracks 2 wherever required. The clamp block 11 could be manufactured from machined extruded aluminium alloy, or a metal casting or by plastic moulding.

Figures 10, 11 and 12 show details of the assembly of an outreach arm 9 to the pole 25 assembly shown in Figure 5. The outreach arm 9 slides over spigot 20 that fits through a clearance hole in the side of pole 1. A transition casting or moulding 23 is used to hide the small gap between the spigot 20 and the clearance hole. A deformable clamp block 11 is fitted to the external track 2, on directly the opposite side of pole 1 to where the outreach arm 9 sticks out of pole 1. Screw 22 is used to clamp the outreach arm spigot 20 in place via the attached spigot end plug 21. When screws 18 and 22 are loosened, clamp 30 block 11 can be slid up or down pole 1 for a small distance to achieve a limited adjustment on the angle of the outreach arm spigot 20 to the longitudinal axis of the pole

assembly. The hole in pole 1 through which screw 22 passes is machined deliberately oversize or is slotted to facilitate this adjustment. Figures 11 and 12 also show that the outreach arm end plug 21 has a tongue 26 on either side of screw 22. The tongue 26 fits into groove 3 inside pole 1 to prevent rotation of the end plug 21. The end plug 21 is

5 fixed to the outreach arm spigot 20 by appropriate fasteners, adhesive or welding. The outreach arm 9 is in turn fixed to the outreach arm spigot 20 by appropriate fasteners, adhesive or welding. Thereby the tongue 26 and groove 3 effectively prevent rotation of the outreach arm 9 and streetlight 10, which is usually but not necessarily fixed to the outreach arm 9.

10 A ventilated top cap 16 is shown in Figures 5 and 12. The cap 16 is attached to a largely hidden inner part of the cap 24 that is fixed to the inside of the top of pole 1 by welding, adhesive or appropriate fasteners such as screws or rivets. The outer cap 16 is fixed to the inner cap 24 by appropriate fasteners, adhesive or welding. Caps 16 and 24 are generally though not necessarily round in shape and can be manufactured from spun aluminium, machined metal, cast metal or plastic mouldings. Gaps between the caps and ventilation holes 25 in the inner cap 24 are employed to aid evaporation of moisture that would otherwise be trapped inside pole 1, thereby minimising the likelihood of corrosion inside the pole.

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Figure 13 is a section of a pole of the type shown in Figure 5 mounted in a prefabricated pit 27 that can be used to hide the installation, foundation or rag bolts 30 and wiring to the pole. The base 15 of the pole assembly is mounted fully within pit 27. The bottom of pit 27 is disposed between foundation 31 and base 15. The bottom of the pit 27 includes jacking screws 29 that are used to adjust the top of the pit lid 26 to ground level 28. The outer edges of pit lid 26 are bevelled so that it will move away from the top of the pit 27 without dislodging the side of the pit 27 if the bottom of the pole is bent or sheared. The pit lid 26 has a raised ridge around the centre hole that the bottom of the recessed circular collar 14 engages or nests on in order to minimise rainwater seepage into the pit 27. Any water seepage that does enter the pit 27 leaves the pit 27 via gaps in the pit base 27 adjacent to the pole base 15. The pit can be installed before a pole is delivered to site.

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30 From the foregoing it should be apparent that the invention encompasses an advantage in the art or at least a commercial alternative to the prior art. Further, it should be clear that the

invention might be embodied in other specific forms without departing from the spirit or scope or the essential characteristics thereof. The present embodiments, therefore, are to be considered in all respects as illustrative and not restrictive. For example whilst column 1 of the above mentioned embodiments has four external tracks 2, it should be understood two or 5 more such tracks can be used in other not shown embodiments.